

CLAIMS

What Is Claimed Is:

1. A method of producing a read head, comprising:
depositing multiple GMR sensor layers into a stack on a bottom shield, the stack
5 having a top side;
applying photoresist material to a first region of the top side of the stack;
removing portions of the stack that are not covered by the photoresist material to
expose portions of the bottom shield and sides of the remaining portions of the stack;
depositing insulator material on to the exposed portions of the bottom shield and
10 against at least portions of sides of the remaining portions of the stack;
removing the photoresist material; and
depositing a top shield that covers the top and substantially surrounds the sides of the
remaining portions of the stack.
2. A method as defined in claim 1, wherein the depositing of the insulator material is
15 a self-aligned process.
3. A method as defined in claim 1, wherein the top and bottom layers of the stack are
electrodes.
4. A method as defined in claim 1, wherein the top, side, and bottom shields are
electrically conducting.
- 20 5. A method as defined in claim 1, wherein a sense current is carried toward and
away from the stack by the shields.
6. A method as defined in claim 3, wherein the multiple GMR sensor layers in the
stack also include a pinned layer and a free layer.

7. A method as defined in claim 6, wherein the multiple GMR sensor layers in the stack also include a stabilization layer.

8. A method as defined in claim 7, wherein the stabilization layer includes patterned areas of exchange material.

5 9. A method as defined in claim 3, wherein the free layer is biased via pile biasing.

10. A method as defined in claim 3, wherein the free layer is biased via patterned exchange biasing.

11. A method as defined in claim 3, wherein the free layer is biased via permanent magnet abutted junctions.

10 12. A method as defined in claim 3, wherein the read head is a CPP read head.

13. A method as defined in claim 1, wherein the operation of depositing insulator material includes depositing electrically conductive leads along with the insulator material so that the electrically conductive leads are in contact with a portion of the stack.

14. A method as defined in claim 13, wherein the read head is a CIP read head.

15 15. A method as defined in claim 1, wherein the multiple GMR sensor layers in the stack also include a pinned layer and a free layer.

16. A method as defined in claim 15, wherein the multiple GMR sensor layers in the stack also include a stabilization layer.

17. A method as defined in claim 16, wherein the stabilization layer includes
20 patterned areas of exchange material.

18. A method as defined in claim 1, wherein the operation of depositing insulator material includes depositing permanent magnet material along with the insulator material so that the permanent magnets are abutted against a portion of the stack.

19. A read head, comprising:

a GMR spin valve stack including at least a pinned layer, a free layer, and a stabilization layer including patterned exchange bias material; and

5 a pair of shields, one disposed on either side of the GMR spin valve stack, with one of the shields being formed to include integral side shields that substantially enclose the GMR spin valve stack between the pair of shields.

20. A read head as defined in claim 19, wherein the GMR spin valve stack is configured to operate in a current perpendicular to plane (CPP) mode.

10 21. A read head as defined in claim 20, wherein the pair of shields are electrically conductive and wherein the GMR spin valve stack includes an electrode at the top thereof and an electrode at the bottom thereof.

22. A read head as defined in claim 19, wherein the GMR spin valve stack is configured to operate in a current in plane (CIP) mode.

15 23. A read head as defined in claim 22, further including electrically conductive leads that are in a gap formed between the pair of shields.

24. A read head as defined in claim 19, further including a layer of insulating material forming a gap between the pair of shields in the regions at either end of the GMR spin valve stack.

20 25. A read head as defined in claim 24, wherein the gap layer is deposited in a self-aligned process.

26. A read head as defined in claim 24, wherein the gap layer includes a portion that covers at least portions of the sides of the stack.

27. A read head, comprising:

a GMR spin valve stack including at least a pinned layer and a free layer;

5 a pair of shields, one disposed on either side of the GMR spin valve stack, with one of the shields being formed to include integral side shields that substantially enclose the GMR spin valve stack between the pair of shields; and

an insulated layer of permanent magnet material disposed between the shields and abutting opposite ends of the GMR spin valve stack.

28. A read head as defined in claim 27, wherein the GMR spin valve stack is
10 configured to operate in a current perpendicular to plane (CPP) mode.

29. A read head as defined in claim 28, wherein the pair of shields are electrically conductive and wherein the GMR spin valve stack includes an electrode at the top thereof and an electrode at the bottom thereof.

30. A read head as defined in claim 27, wherein the GMR spin valve stack is
15 configured to operate in a current in plane (CIP) mode.

31. A read head as defined in claim 30, further including electrically conductive leads that are with the permanent magnet material in a gap formed between the pair of shields.

32. A read head as defined in claim 31, further including a layer of insulating material on either side of the permanent magnet material and conductive leads to form a gap between
20 the pair of shields in the regions at either end of the GMR spin valve stack.

33. A read head as defined in claim 27, further including a layer of insulating material on either side of the permanent magnet material to form a gap between the pair of shields in the regions at either end of the GMR spin valve stack.

34. A read head as defined in claim 33, wherein the gap layer is deposited in a self-aligned process.

35. A read head as defined in claim 33, wherein the gap layer includes a portion that covers at least portions of the sides of the stack.

5 36. A read head as defined in claim 27, wherein the GMR spin valve stack includes a free layer having opposed ends and the layer of permanent magnet material abuts at least a portion of the ends of the free layer.